

Dynamic Range

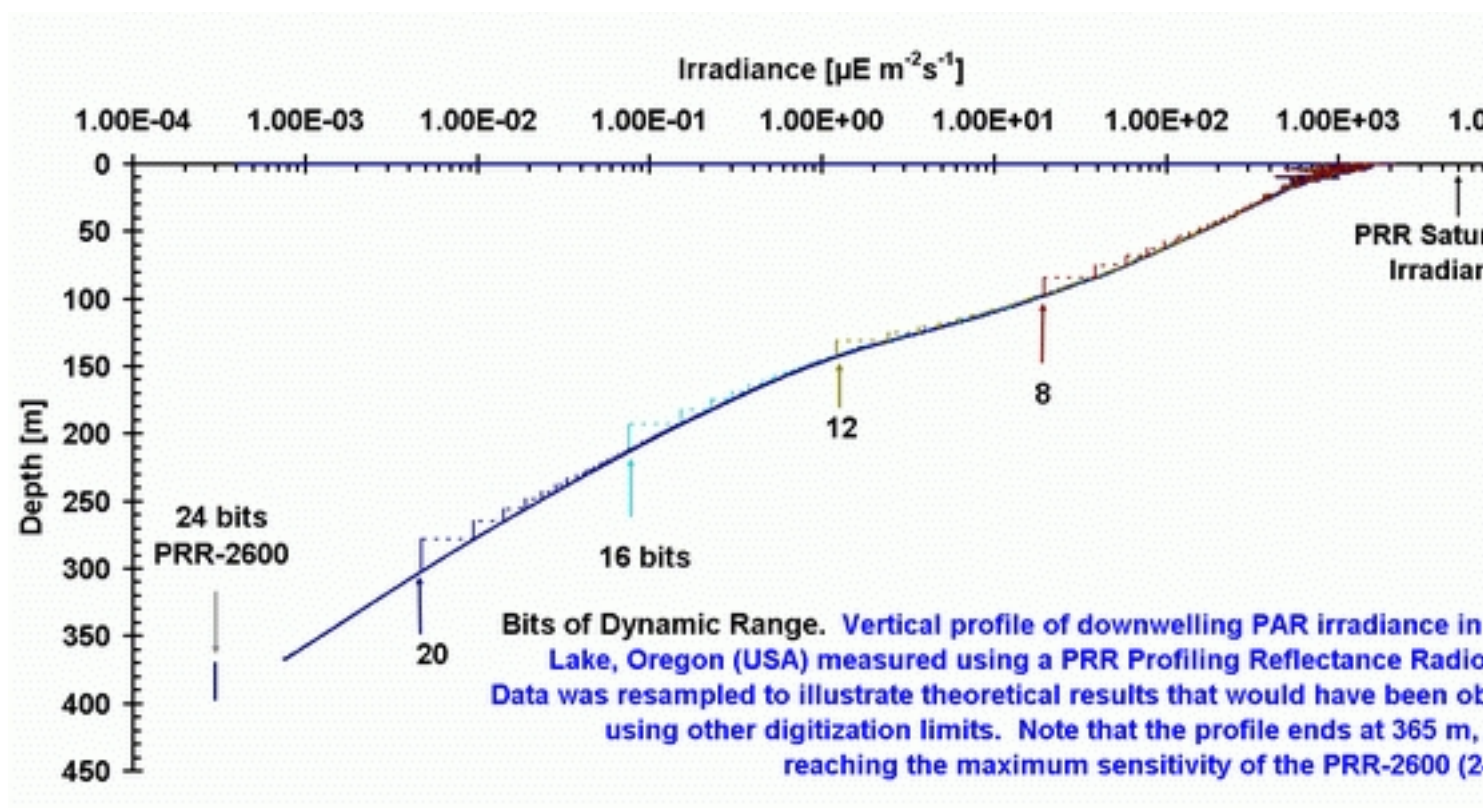
Written by Rocky

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The ratio between the largest and smallest measurable value is called the dynamic range. Those with an engineering bent often express dynamic range in decibels ($db = 20 \cdot \log(\text{Reading}_1 / \text{Reading}_2)$), where the two readings being compared are in volts. It is also convenient to use the resolution of the associated analog-to-digital electronics. Thus, you may see dynamic range expressed in bits (e.g., 16 or 20 bits).

Useful wide dynamic range requires more than extra bits — high-quality, low-noise electronics are also needed to ensure that any extra bit depth is well used.

In the microradiometer, dynamic range is more complicated. In systems based on these sensors, in addition to using a 24 bit analog-to-digital converter, the current-to-voltage conversion section has three "gains," each separated by a factor of 200. In this case, we are able to extend the range to more than 9 decades.



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